

PATENT ABSTRACTS OF JAPAN

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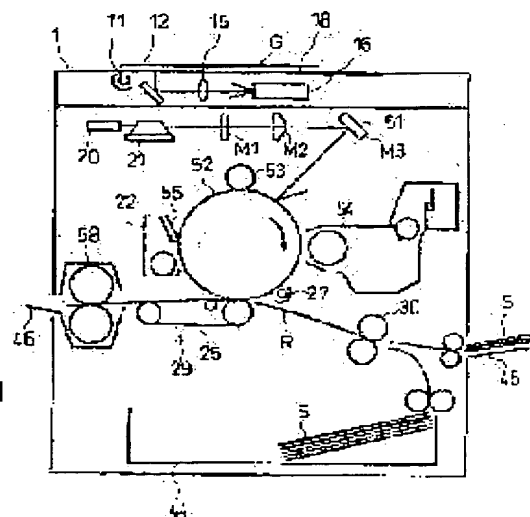
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(54) IMAGE FORMING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an image forming device which can uniformly transfer a toner image to the entire surface of a transfer material and suppress toner scatter around character parts even when an intermediate-resistance belt is used for a negative-positive development type transfer device.

SOLUTION: This image forming device is equipped with an image carrier 52, an electrifying device 53, a developing device 54, and a transfer device 29; and the developing device 54 develops an exposed part of the image carrier 52 with toner having the same polarity as the charged polarity of the image carrier 52 and the transfer device 29 transfers the toner image by pressing the transfer material S against the image carrier 52 in contact with the intermediate-resistance belt 25 and is equipped with a charge neutralizing lamp 27 which neutralizes charges on the image carrier 52 with light before the transfer by the transfer device 29. The charge neutralizing lamp 27 is characterized by that a ground part on the image carrier 52 is exposed up to a half-tone potential.



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CLAIMS

[Claim(s)]

[Claim 1] The image support by which the electrostatic latent image corresponding to image information is formed in the front face of exposure, The developer which forms a toner image on image support by supplying a toner to the electrostatic latent image formed in the electrification equipment which carries out electrification processing of the front face of image support, and the front face of image support, and visualizing an electrostatic latent image, In image formation equipment equipped with the imprint equipment which imprints the toner image on image support to imprint material said developer The exposure section of image support is developed with the electrification polarity of image support, and the toner of a like pole. Said imprint equipment A toner image is imprinted by sticking imprint material to an inside resistance belt, and carrying out a pressure welding to image support. It is image formation equipment [claim 2] which is equipped with the electric discharge lamp which discharges the charge on image support by light before the imprint by imprint equipment, and is characterized by an electric discharge lamp exposing the natural complexion section on image support even to halftone potential. The electric discharge with said electric discharge lamp is image formation equipment according to claim 1 characterized by being carried out to the part beyond the imaging section on image support.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is [0002] about the digital image formation equipment of the negative-positive development method equipped with the imprint equipment which consists of an inside resistance belt especially with respect to the image formation equipment which used electrophotography methods, such as a copying machine, a printer, and facsimile.

[Description of the Prior Art] Generally, with the image formation equipment for which the electrostatic photograph process is used, the electrostatic latent image corresponding to a manuscript image is formed in the front face of the photo conductor beforehand charged in the predetermined polarity. This electrostatic latent image is developed in the development section prepared in the predetermined location around a photo conductor. That is, an electrostatic latent image is developed and visualized with the toner which is the electrified pulverized coal supplied from the development section. The toner image formed on the photo conductor reaches to the imprint section by rotation of a photo conductor, and is imprinted by the imprint material (recording paper) conveyed by the imprint section. Then, it is fixed to the toner image imprinted by imprint material to imprint material in the fixing section.

[0003] By the way, in the imprint processing by said imprint section, in order to prevent imprint nonuniformity and a poor imprint, various proposals are made from the former. For example, in imprint belt equipment, the technique of preventing the imprint nonuniformity resulting from the nonuniformity of the resistance of an inside resistance imprint belt is indicated by JP,5-113725,A by preparing the contact electrode for supplying an imprint current to an inside resistance imprint belt in two places.

[0004] Moreover, the technique of preventing a poor imprint and poor separation of a transfer paper is indicated by specifying the location and electrical potential difference of a contact electrode for supplying an imprint current to an inside resistance imprint belt to JP,5-333717,A in imprint belt equipment.

[0005] Moreover, while obtaining the imprint nature stabilized by giving a charge contrary to the polarity to a photo conductor before an imprint in the imprint section, and discharging a photo conductor in the image-formation equipment which performs positive-positive development with the toner which has the surface charge of a photo conductor, and the charge of reversed polarity in JP,5-232825,A, the technique adjust the output of an electric-discharge machine according to the amount of toners adhering to the non-image section, and prevent natural-complexion dirt is indicated.

[0006]

[Problem(s) to be Solved by the Invention] In the digital image formation equipment which develops negatives with the charge of a photo conductor, and the toner of like-pole nature, when the imprint belt of inside resistance is used for imprint equipment, the current of the polarity and reversed polarity of a toner and a photo conductor is supplied to an imprint belt, and, thereby, the toner on a photo conductor is imprinted on imprint material. Transition of the potential of the photo conductor in the negative-positive development process at this time is shown in (a) - (c) of drawing 3. (c) of the potential condition of a photo conductor [in / in (a) of drawing 3 / an

electrification process], the potential condition of a photo conductor [in / in (b) of drawing 3 / a write-in process], and drawing 3 shows the potential condition of the photo conductor in a development process, respectively. the development toner with which VD is the potential of the write-in section of a photo conductor, and the electrification potential (minus) of a photo conductor and VL are used for it among drawing -- the polarity of minus -- **** -- it is.

[0007] The toner image formed on the photo conductor through such a negative-positive development process is imprinted on imprint material by supplying an imprint current to the imprint belt contacted by the photo conductor. Since the current which contacted a photo conductor and directly and was supplied to the imprint belt is canceled with the electrification charge on a photo conductor, without that longitudinal direction field where an imprint belt is located in a both-ends field [of that cross direction], tip [of imprint material], and back-end side at this time minding imprint material, in imprint material, it becomes easy to produce imprint nonuniformity in the point and the back-end section which meet in the both ends and the feed direction of that cross direction.

[0008] What is necessary is just to discharge the charge on a photo conductor before an imprint, in order to prevent such imprint nonuniformity. However, when the charge of a photo conductor is discharged after negative-positive development, there is a problem that toner **** will occur around the alphabetic character section as shown in (d) of drawing 3 .

[0009] This invention is made paying attention to said situation, and the place made into the purpose is to offer the image formation equipment which can control toner **** around the alphabetic character section while being able to imprint a toner image to homogeneity over the whole surface of imprint material, even if it is the case where an inside resistance belt is used for imprint equipment by the NEGAPOJI development method.

[0010]

[Means for Solving the Problem] In order to solve said technical problem, invention according to claim 1 The image support by which the electrostatic latent image corresponding to image information is formed in the front face of exposure, The developer which forms a toner image on image support by supplying a toner to the electrostatic latent image formed in the electrification equipment which carries out electrification processing of the front face of image support, and the front face of image support, and visualizing an electrostatic latent image, In image formation equipment equipped with the imprint equipment which imprints the toner image on image support to imprint material said developer The exposure section of image support is developed with the electrification polarity of image support, and the toner of a like pole. Said imprint equipment It has the electric discharge lamp which imprints a toner image by sticking imprint material to an inside resistance belt, and carrying out a pressure welding to image support, and discharges the charge on image support by light before the imprint by imprint equipment, and is characterized by this electric discharge lamp exposing the natural complexion section on image support even to halftone potential.

[0011] While according to this invention according to claim 1 uniform imprint nature is obtained over the whole surface of imprint material and the good good image of solid homogeneity is obtained, toner **** from the alphabetic character section of the toner image formed in negative-positive development can be controlled. In addition, halftone potential means making electrification potential of image support into the range of -300 thru/or -500V.

[0012] Moreover, invention according to claim 2 is characterized by performing electric discharge with said electric discharge lamp to the part beyond the imaging section on image support in invention according to claim 1.

[0013] According to this invention according to claim 2, while the same operation effectiveness as claim 1 is acquired, toner **** from the toner image of the image section formed in negative-positive development can be prevented, and more uniform imprint nature can be obtained.

[0014]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained, referring to a drawing.

[0015] Drawing 1 shows the rough configuration of the image formation equipment (a digital copier/printer) concerning 1 operation gestalt of this invention. Image formation equipment is

equipped with the laser beam study system which has an image reading means 1 to irradiate light at the manuscript G laid on contact glass 18, and to read the reflected light (image information), the write-in section 51 which outputs a laser beam based on the image information read with the image reading means, and the mirrors M1, M2, and M3 which draw a laser beam in the predetermined direction like illustration.

[0016] The image reading means 1 consists of a scanner. This scanner 1 mainly consists of the mirror 12 and lens 15 which lead the reflected light reflected in the light source 11 for illuminating Manuscript G, and the field of Manuscript G to CCD (solid state image sensor)16, and a scanner drive motor for operating a scanner 1 in the direction of vertical scanning, and where Manuscript G is placed on contact glass 18, it performs reading actuation. The reflection density of Manuscript G is read by CCD16, and, specifically, is changed into digital data. And the image processing of the digital data is carried out, the laser luminescence time amount over each pixel is adjusted, and write-in actuation mentioned later is performed.

[0017] The write-in section 51 is equipped with the semiconductor laser luminescence equipment 20 which outputs the laser beam for the exposure according to image data. After the laser beam outputted from semiconductor laser luminescence equipment 20 is drawn in the predetermined direction by mirrors M1, M2, and M3 while being reflected by the polygon mirror 21 to rotate, it is irradiated by the front face of the photo conductor drum 52 mentioned later. Specifically, an electrostatic dot-like latent image is written in by ON/OFF of a laser beam on the photo conductor drum 52. In this case, the luminescence pulse period of a laser beam is controlled for every dot, and it uses for a gradation expression.

[0018] In addition, both a reading consistency and a write-in consistency are 600dpi. Moreover, the quantity of light of the write-in laser beam injected from semiconductor laser luminescence equipment 20 is 300 microwatts.

[0019] Moreover, image formation equipment has the photo conductor 52 as image support with which a laser beam is irradiated and the electrostatic latent image corresponding to image information is formed in the front face. Around the photo conductor 52 which rotates in the drawing Nakaya mark direction The developer 54 which forms a toner image on a photo conductor 52 by supplying a toner to the electrostatic latent image formed in the electrification equipment 53 which carries out electrification processing of the front face of a photo conductor 52, and the front face of a photo conductor 52, and visualizing an electrostatic latent image, The imprint equipment 29 which imprints the toner image on a photo conductor 52 in the form S which is imprint material, The LED lamp (electric discharge lamp) 27 which performs optical electric discharge (elimination of the charge on a photo conductor) of the charge on a photo conductor 52 before the imprint by imprint equipment 29, and the cleaning equipment 22 which cleans a photo conductor 52 in preparation for the next copy processing after imprint processing termination are formed.

[0020] The rotational speed of a photo conductor 52 is set as 300 mm/sec. Electrification equipment 53 electrifies the front face of a photo conductor 52 in -900V. This electrification potential is decided by balance of the greasing generated in development. The potential of the part of the written-in photo conductor (the laser beam was irradiated) 52 falls, and is set to -100V in the solid image section. Moreover, a developer 54 develops the electrostatic latent image on a photo conductor 52 by 2 component development method which uses the admixture of a toner and a carrier as a developer. Specifically the electrical potential difference of -550V is impressed to a development sleeve, a development potential setup is set to 450V, and NEGAPOJI development (reversal development) of the electrostatic latent image is carried out to the potential of a photo conductor 52 with the electrification toner (minus toner) of like-pole nature. Moreover, imprint equipment 29 consists of the urethane rubber belt (henceforth an imprint belt) in which resistance of 108-1013-ohmcm is shown and which was formed into inside resistance. Moreover, cleaning equipment 22 has the cleaning blade 56 which fails to scratch the transfer residual toner on a photo conductor 52.

[0021] The feed equipment which has the medium trays 44 and 45 attached free [attachment and detachment] to the body of equipment is formed in the image formation equipment bottom. Moreover, the resist roller 30 of the pair which turns to imprint equipment 29 the form S to which

paper was fed from said feed equipment, and is sent out to predetermined timing, the anchorage device 58 for fixing the toner image imprinted by Form S with imprint equipment 29, and the paper output tray 46 that receives the form S with which fixing processing was performed are formed in image formation equipment. An anchorage device 58 has the fixing roller with which the heater was built in, and the pressurization roller by which a pressure welding is countered and carried out to a fixing roller, and is established with the heat of a heater in the toner image of the form S passing through between these rollers. In addition, the form S fixed to the toner image with the anchorage device 58 is in the condition which turned the image side down, and is discharged on a paper output tray 46.

[0022] Next, the imprint actuation in the image formation equipment of the above-mentioned configuration is explained.

[0023] With the resist roller 30, the form S which has had the conveyance path R top conveyed is predetermined timing, and is supplied between the imprint belt 25 and a photo conductor 52. At this time, the toner image on a photo conductor 52 is imprinted on Form S by what the charge on a photo conductor 52 and the charge of reversed polarity are supplied to the imprint belt 25 by constant current control for from a bias electrode (an imprint current is supplied). The electrification width of face on the photo conductor 52 in that case (longitudinal direction), write-in width of face, development width of face, form width of face, and imprint belt width of face are shown in drawing 2. Like illustration, the current which is the circumference of the part A which contacts a photo conductor 52 exceeding form width of face, and was supplied to the imprint belt 25 the imprint belt 25 Since it is canceled with the electrification charge on a photo conductor 52, if processing peculiar to this operation gestalt mentioned later is not performed, in Form S, it is the point and the back end section which meet in the both ends and the feed direction of the cross direction, and imprint nonuniformity arises.

[0024] Processing peculiar to this operation gestalt for preventing generating of such imprint nonuniformity is eliminating the charge on the front face of the developed photo conductor 52 with the LED lamp 27, before starting imprint actuation. And this electric discharge does not eliminate all the charges of the natural complexion section of a photo conductor 52, but is made into the electrification potential of a halftone. It is specifically set as 100 microwatts whose quantity of lights of electric discharge with the LED lamp 27 are about 1 of the LD write-in quantity of light/3, and the natural complexion section potential of the photo conductor 52 before an imprint is set as -500V. In addition, what is necessary is not to limit natural complexion section potential to -500V, but for the range of it just to be -300V thru/or -500V.

[0025] By such processing, uniform imprint nature was obtained over the whole surface of Form S, and the good good image of solid homogeneity was obtained (imprint nonuniformity was eased in the point and the back end section which meet in the crosswise both ends and the crosswise feed direction of Form S). It did not come out so much and toner **** from the alphabetic character section of the toner image formed in negative-positive development was also controlled.

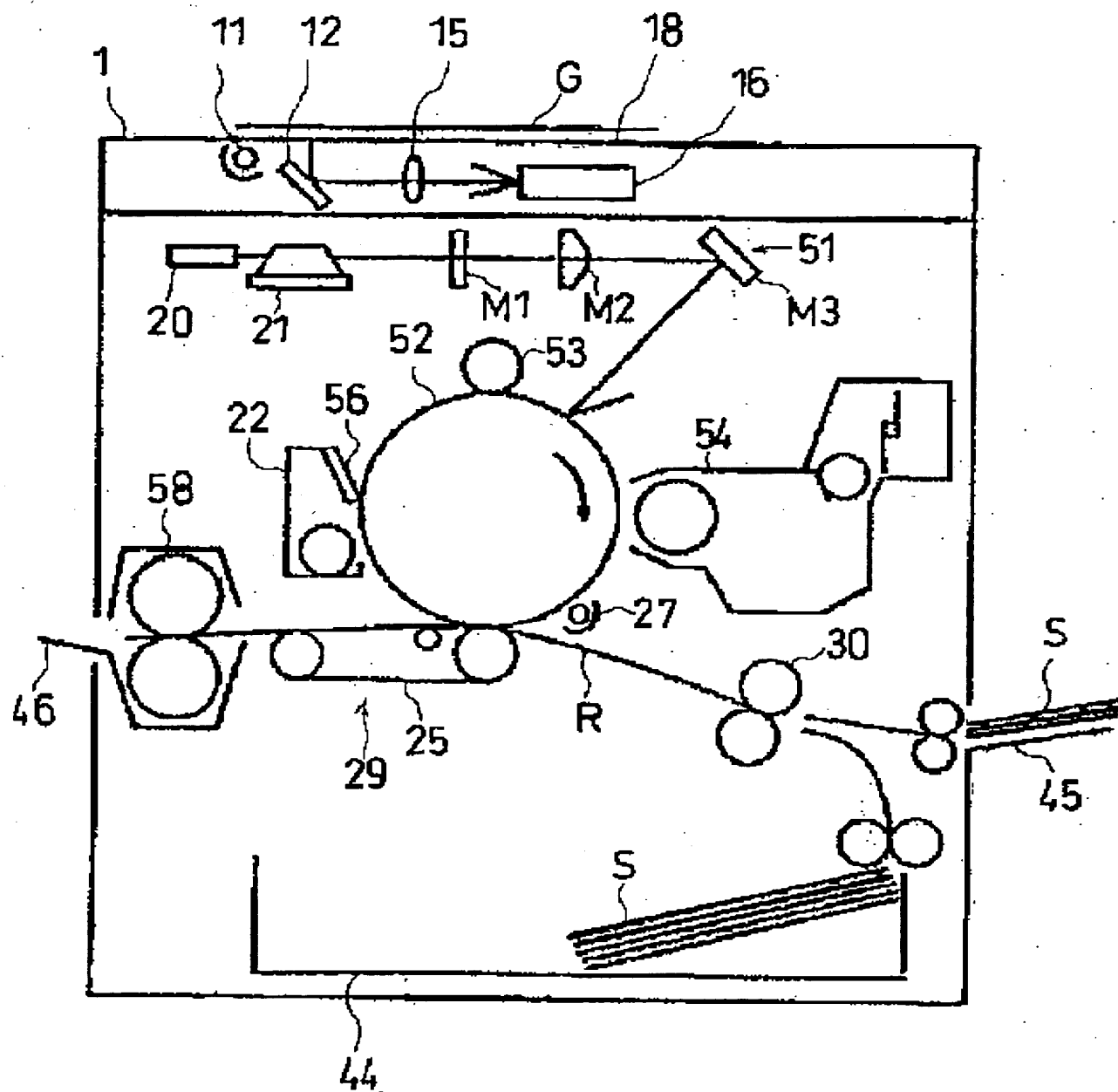
[0026] In addition, it may be made to perform such electric discharge before an imprint only into the part of the photo conductor 52 with which Form S does not contact. Toner **** from the toner image of the image section formed in negative-positive development can be prevented by this, and uniform imprint nature is obtained over the whole surface of Form S (the concentration nonuniformity in an image edge is prevented and the image of uniform solid concentration is obtained).

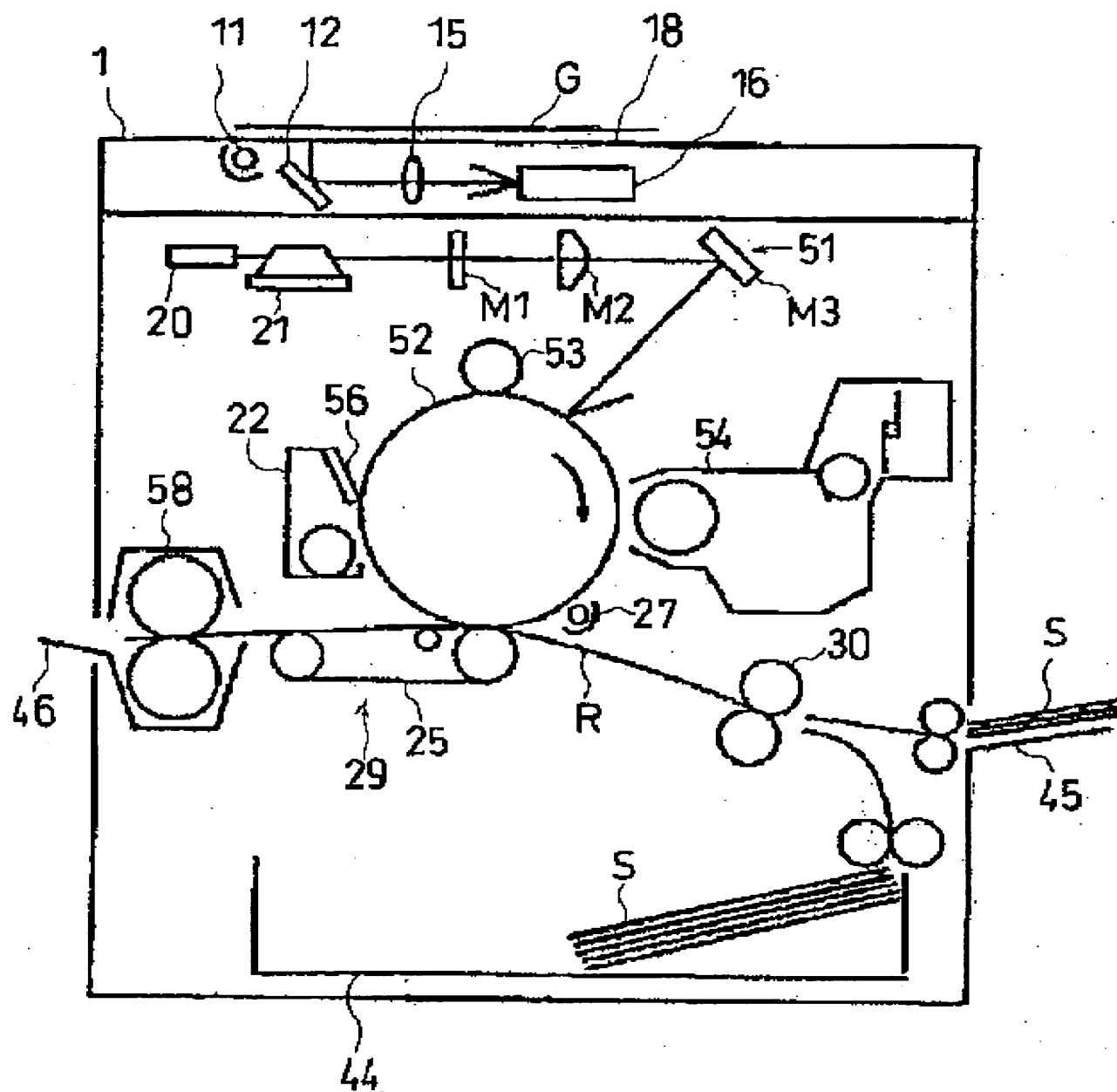
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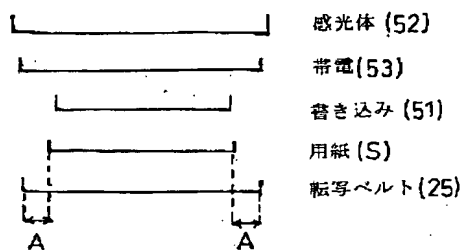
[Effect of the Invention] While according to invention according to claim 1 uniform imprint nature is obtained over the whole surface of imprint material and the good good image of solid homogeneity is obtained, toner **** from the alphabetic character section of the toner image formed in negative-positive development can be controlled.

[0028] According to invention according to claim 2, while the same operation effectiveness as claim 1 is acquired, toner **** from the toner image of the image section formed in negative-positive development can be prevented, and more uniform imprint nature can be obtained.

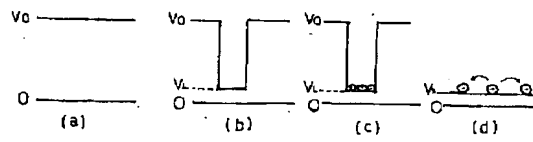
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Drawing selection 

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